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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/801,377	03/15/2004	Pooran Chandra Joshi	SLA0766	3179
55286	7590	05/03/2006	EXAMINER	
SHARP LABORATORIES OF AMERICA, INC. C/O LAW OFFICE OF GERALD MALISZEWSKI P.O. BOX 270829 SAN DIEGO, CA 92198-2829			DUONG, KHANH B	
			ART UNIT	PAPER NUMBER
			2822	

DATE MAILED: 05/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/801,377

Applicant(s)

JOSHI, POORAN CHANDRA

Examiner

Khanh B. Duong

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 25 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 25 is/are allowed.
- 6) ☒ Claim(s) 1-7, 17-20, 22-24 and 26 is/are rejected.
- 7) ☒ Claim(s) 8-16 and 21 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☒ Certified copies of the priority documents have been received in Application No. 10/295,400.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 3/15/04.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election without traverse of Group I, claims 1-26, in the reply filed on January 25, 2006 is acknowledged.

In addition, claims 27-31 were canceled.

Currently, claims 1-26 remain pending.

### ***Priority***

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. 10/295,400, filed on November 14, 2002.

### ***Information Disclosure Statement***

The information disclosure statement (IDS) submitted on March 15, 2004 is being considered by the examiner.

### ***Specification***

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: METHOD OF FORMING AN OXIDE WITH IMPROVED OXYGEN BONDING.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

**Claim 24 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

Claim 24 recites the limitation "the substrate" in line 1. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 1-7, 17-20, 22, 23 and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Lim (U.S. Patent No. 6,387,749).**

Re claims 1, Lim discloses in FIG. 1B a method comprising: depositing an M oxide (tantalum oxide) layer 15 where M (tantalum) is a first element selected from a group including elements chemically defined as a solid and having an oxidation state in a range of +2 to +5; plasma oxidizing the M oxide layer 15 at a temperature of 150-400°C (including less than 400°C) using a high density (HD) plasma source; and, in response to plasma oxidizing the M oxide layer, inherently improving M-oxygen (M-O) bonding in the M oxide layer 15 [see col. 2, line 49 to col. 3, line 7].

Re claim 2, Lim discloses using the plasma oxidizing process to remove the carbon and oxygen defects within the tantalum oxide film 105 [see col. 2, line 65 to col. 3, line 3]. Thus, it

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is understood that the plasma oxidizing the tantalum oxide layer 15 includes diffusing excited oxygen radicals into the tantalum oxide layer 15.

Re claim 3, see discussion above regarding claim 2. Thus, it is also understood that the improving tantalum-oxygen (M-O) bonding in the tantalum oxide layer includes bonding oxygen radicals to tantalum (element M) in the tantalum (M) oxide layer.

Re claim 4, see discussions above regarding claims 2 and 3. Furthermore, Lim discloses depositing an tantalum oxide layer 15 [see col. 2, line 49 to col. 3, line 7] inherently includes: depositing a first tantalum oxide molecule with a first number of bonded oxygen atoms; wherein bonding oxygen radicals to tantalum atoms in the tantalum oxide layer 15 includes bonding oxygen radicals to the first tantalum oxide molecule; and, wherein improving tantalum-oxygen bonding in the tantalum oxide layer includes increasing the number of bonded oxygen atoms in the first tantalum oxide molecule to a second number greater than the first number.

Re claim 5, see discussion above regarding claims 2-4. Furthermore, it is also inherent that bonding oxygen radicals to M atoms in the M oxide layer includes bonding oxygen radicals to dangling M bonds.

Re claim 6, see discussions above regarding claims 2-5. Furthermore, it is also inherent that diffusing excited oxygen radicals into the tantalum oxide layer 15 includes breaking process-induced impurity bonds attached to a first tantalum atom; and, wherein bonding oxygen radicals to tantalum atoms in the tantalum oxide layer 15 includes bonding oxygen radicals to the first tantalum atom.

Re claim 7, see discussions above regarding claims 2-6. Furthermore, it is also inherent that depositing an tantalum oxide layer 15 includes depositing a tantalum oxide molecule with

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tantalum-oxygen bonds in a non-stoichiometric energy state; and, wherein improving tantalum-oxygen bonding in the tantalum oxide layer 15 includes converting non-stoichiometric tantalum-oxygen bonds to stoichiometric tantalum-oxygen bonds.

Re claim 17, Lim discloses depositing an tantalum oxide layer 15 where tantalum is an element selected from a group including elements chemically defined as a solid and having an oxidation state in a range of +2 to +5 [see col. 2, lines 49-55].

Re claim 18, Lim discloses depositing an tantalum oxide layer 15 includes depositing an tantalum oxide layer 15 inherently with a refractive index first value; and, wherein improving tantalum-oxygen bonding in the tantalum oxide layer 15 inherently includes increasing the refractive index first value.

Re claim 19, Lim discloses depositing an tantalum oxide layer 15 includes depositing an tantalum oxide layer 15 inherently with a leakage current first value; and, wherein improving tantalum-oxygen bonding in the tantalum oxide layer 15 inherently includes decreasing the leakage current first value [see col. 2, line 65 to col. 3, line 7].

Re claim 20, Lim discloses plasma oxidizing the tantalum oxide layer 15 at a temperature of less than 400°C includes plasma oxidizing the tantalum oxide layer 15 at a temperature of less than 200°C [see col. 2, lines 64-65].

Re claims 22 and 23, Lim discloses depositing an tantalum oxide layer 15 includes depositing the tantalum oxide layer 15 at temperature of 330-420°C.

Re claim 26, see discussions above regarding claim 1. In addition, Lim discloses the plasma oxidizing process is carried out in a processing apparatus (chamber) [see col. 3, lines 3-5].

*Allowable Subject Matter*

Claims 8-16, 21 and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. In addition, claim 24 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Claim 25 is allowed.

The following is a statement of reasons for the indication of allowable subject matter: none of the prior art of record, taken alone or in combination, fairly discloses all the limitations as claimed.

Re claim 25, none of the prior art of record fairly discloses the following limitations in combination with the rest of the limitations in the claim: plasma oxidizing the M oxide layer at a temperature of less than 400° C using a transmission/transformer coupled plasma source.

*Conclusion*

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following references disclose relevant teachings regarding the instant invention: Yang '210, Usami '662, Ono '287, Joshi '960 and Johsi '646.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh B. Duong whose telephone number is (571) 272-1836. The examiner can normally be reached on 10:00-6:30.

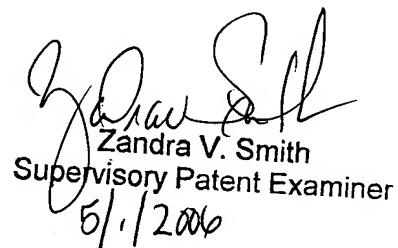
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith, can be reached on (571) 272-2429. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



KBD



Zandra V. Smith  
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6/1/2006